International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 04 | Apr-2018 www.irjet.net p-ISSN: 2395-0072

Examination Room Guidance System Using RFID and Arduino

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Abstract - *Aim of this project is guiding the student at the examination centers. Now a day's 99% of the exams are held jumbling system. In this process so many students facing problems in searching rooms. Most of the students feel tense before coming to exam and they still feel tense in searching for their place for exam. Our project is helpful in these cases. Each and every student will be issued an RFID card as their hall ticket. While they reaching the college premises and by showing their hall ticket to the RFID reader. That will automatically display the room number of that person. Our project will mainly save the time in searching for the room in examination centers.*

Key Words: Arduino, Examination Guidance, Room guidance, RFID System.

1. INTRODUCTION

RFID (Radio Frequency identification) technology is an emerging technology], used in a wide range of applications, is a member in the family of Automatic Identification and Data Capture (AIDC) technologies which is fast and reliable means for identification of objects.

The RFID is composed of two main components. The Interrogator (RFID Reader) which transmits and receives the signal and the Transponder (tag) that is attached to the object. In an RFID system, RFID tags are "interrogated" by an RFID reader. The tag reader generates a radio frequency "interrogation" communicates with the tags. The reader also has a receiver that captures a reply signal from the tags and decodes that signal.

The reply signal from the tags reflects, the tag's data content. The reply signal is created as passive "backscatter" An RFID tag is composed of a miniscule microchip and antenna. The RFID alone has numerous application but when is spliced with microcontroller the boundaries expands further.

Developments in RFID technology continue to yield larger memory capacities, wider reading ranges, and faster processing. It's highly unlikely that the technology will ultimately replace bar code even with the inevitable reduction in raw materials coupled with economies of scale, the integrated circuit in an RF tag will never be as cost effective as a bar code label. However, RFID will continue to grow in its established niches where bar code or other optical technologies are not effective. If some standards commonality is achieved, whereby RFID equipment from different manufacturers can be used interchangeably, the market will very likely grow exponentially.

2. EXISTING SYSTEM

This project proposes a solution for examinations based on jumbling system. It may cause students facing difficulty in finding their respective rooms. This system aids in finding respective exam halls and seats using RFID Technology. Each and every student is allotted an RFID Tag. Using RFID Technology, a valid candidate will be able to will be able to find his examination venue easily. The existing systems in which the authors implemented a model of secured and portable embedded reader system. Another existing system emphasis supply chain management which uses the application of RFID. Another review is the use of RFID in an integrated circuit to resolve inventory transactions issues.

This system reduces cost and man-made errors. Automated attendance management system [4] is a system in which they used both electronic and mobile platform using stationary matrix AR 400 RFID reader and MC 9000-G handheld RFID reader respectively. Zhang Young [5] designed a wireless fingerprint-based attendance system to record and obtain the attendance data using finger prints. The RFID reader interrogate with the tag swiped by the student and will obtain the information contained in it [7]. This will be passed on to the controller. For further security, a password is provided and the student have to enter it via the keypad. If both the id and password match, the LCD screen interfaced with the controller will display the room number of the candidate thus identifying him as an authorized entry.

Whenever the student enters into the Examination center, he has to keep his RFID TAG to the reader which is attached to our microcontroller based embedded board. At that moment the reader will checks weather the information of the student is correct or not and then it will decide to display the student room number on LCD display. If the information of the student is correct then he will be permitted inside otherwise he will not permit inside. The information of the student will be send to the microcontroller through one wire protocol. And the information of the access system will be displayed on the LCD which we embedded to our board. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/18v step down transformer. Developments in RFID technology continue to yield larger memory capacities, wider reading ranges, and faster processing.

3. PROPOSED SYSTEM

This system aids in finding respective exam halls and seats using RFID Technology. Each and every student is allotted an RFID Tag. The block diagram is shown in below figure1.

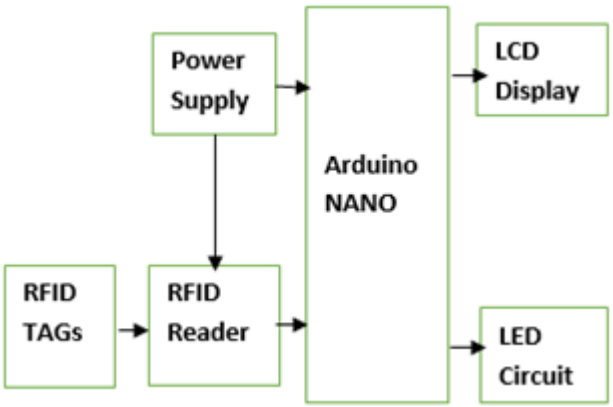

Figure 1: Block Diagram of Proposed System

The proposed system consists of Arduino NANO, RFID Reader, RFID Tags, LCD, LEDs.

Arduino NANO: The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.0) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality of the Arduino. The Arduino NANO is shown in below figure 2.

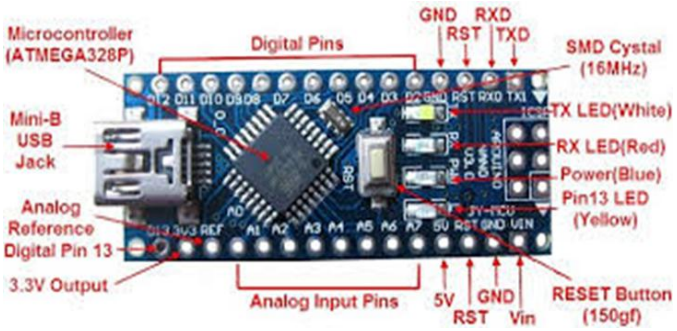

Figure 2: Arduino NANO

The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source. The FTDI FT232RL chip on the Nano is only powered if the board is being powered over USB. As a result, when running on external (non-USB) power, the 3.3V output (which is supplied by the FTDI chip) is not available and the RX and TX LEDs will flicker if digital pins 0 or 1 are high.

The ATmega168 has 16 KB of flash memory for storing code (of which 2 KB is used for the bootloader); the ATmega328 has 32 KB, (also with 2 KB used for the bootloader). The ATmega168 has 1 KB of SRAM and 512 bytes of EEPROM (which can be read and written with the EEPROM library); the ATmega328 has 2 KB of SRAM and 1 KB of EEPROM.

RFID Reader: The reader or scanner, functions similarly to a barcode scanner however while a barcode scanner uses a laser beam to scan the barcode, an RFID scanner uses electromagnetic waves. To transmit these waves, the scanner uses an antenna that transmits a signal, communicating with the tags antenna. The tags antenna receives data from the scanner and transmits its particular chip information to the scanner.

Figure 3: RFID Reader

The data on the chip is usually stored in one of two types of memory. The most common is Read-Only Memory (ROM); as its name suggests, read-only memory cannot be altered once programmed onto the chip during the manufacturing process. The second type of memory is Read/Write Memory; though it is also programmed during the manufacturing process, it can later be altered by certain devices.

RFID Tag: RFID tag is a small device which stores and sends data to RFID reader. They are categorized in two types – active tag and passive tag. Active tags are those which contain an internal battery and do not require power from the reader. Typically, active tags have a longer distance range than passive tags. Passive tags are smaller and lighter in size than the active tags. They do not contain an internal battery and thus depend on RFID reader for operating power and certainly have a low range limited up too few meters.

Figure 4: RFID Tag

Advantages of RFID

- ✓ Non-line of sight identification of tags.
- ✓ Unattended operations are possible, minimizing human errors and high cost.
- ✓ Ability to identify moving elements that have tags embedded.
- ✓ Larger area of coverage, Up to several feet.

- ✓ Can be used in diverse environments, including livestock, military, and scientific areas.
- ✓ RFID can be used in addition to Bar Code. These two technologies can be complementing each other.

LCD Display: LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. Liquid crystal display is finding wide unfold use replacing LEDs (seven section LEDs or other multi segment LEDs) because of the following reasons.

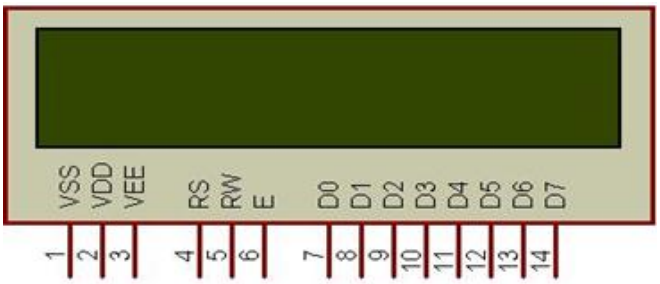

Figure 5: LCD

- ➢ The declining expenses of LCDs.
- ➢ The ability to show numbers, characters and portraits. this is in comparison to LEDs, which can be limited to numbers and a few characters.
- ➢ Incorporation of a clean controller into the LCD, thereby relieving the CPU of the mission of refreshing the liquid crystal display. In comparison, the LED ought to be refreshed by using the CPU to maintain displaying the records.
- ➢ Ease of programming for characters and snap shots. these additives are "specialized" for getting used with the microcontrollers, this means that that they can't be activated via general IC circuits. they may be used for writing specific messages on a miniature liquid crystal display.

LCD interfacing with controller: The LCD standard requires 3 control lines and 8 I/O lines for the data bus.

8 data pins D7-D0

Bi-directional data/command pins.

Alphanumeric characters are sent in ASCII format.

RS (Register Select)

RS = 0 -> Command Register is selected

RS = 1 -> Data Register is selected

R/W (Read or Write)

0 -> Write, 1 -> Read

E: Enable (Latch data)

Used to latch the data present on the data pins. A high-to-low edge is needed to latch the data.

LED: A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current pass through it. The light is not particularly bright, but in most LEDs, it is monochromatic, occurring at a single wavelength.

The LED Circuit is Used to indicate the room numbers.

Power Supply: The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.

The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units. The block diagram is shown in below figure 6.

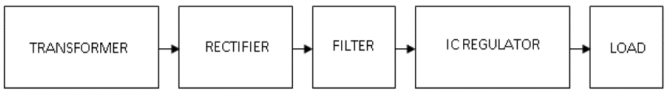

Figure 6: Power Supply Block Diagram

4. EXPERIMENTAL RESULTS

The Examination details like, exam name, student name, exam code, roll number, register number, room number, bench number are saved in Arduino Nano inbuilt memory. When the RFID placed in front of RFID reader the detail according to that particular RFID tag shown in the LCD display, and the particular room LED is glow. The Experimental setup is shown below figure 7.1.

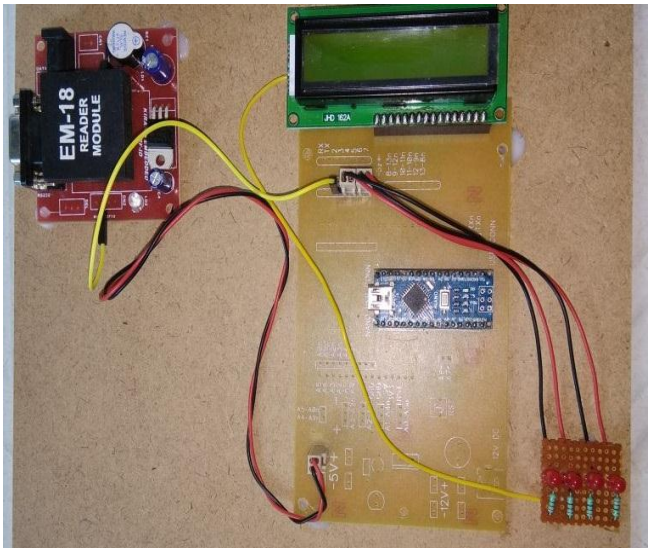

Figure 7.1: Experimental setup

Figure 7.1. Experimental Result

5. CONCLUSION

By integrating RFID Technology, we could successfully develop an embedded system for examination room guidance, in a cost effective and time efficient manner. The current system can be enhanced with finger print detection for more security. Also, it can be integrated with an IR sensor and can be used for attendance monitoring. Thus, the system has wide scope of development that can contribute to great innovations.

6. FUTURE SCOPE

For the existing system we can also add figure print authentication and face recognition system can also be implemented for the purpose of better safety. Adding more features like maintaining student's detail like fee due, library transactions, attendance etc. The idea is beneficial to both the student and the corporate society depending upon its effective implementation as it shows in the seeds to develop various veritable projects.

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